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Prepared by Environment Canada on behalf of the
FEDERAL PROVINCIAL GROUNDWATER WORKING GROUP

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GUIDELINES

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**NATIONAL SURVEY ON PRIORITY TOPICS FOR THE DEVELOPMENT
OF GROUNDWATER GUIDELINES**

GUIDELINES

GUIDELINES

April 1, 1993



Environment
Canada

Environnement
Canada

Canada



National Survey on Priority Topics for the Development of Groundwater Guidelines

Prepared by:

**E. Nicolson
Environment Canada
Hull, Quebec**




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Published by authority of
the Minister of the Environment

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Cat. N° En 37-105/1993E
ISBN 0-662-21212-6

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SUMMARY

- To understand this summary it helps to refer to the pages in question.
- To put the significance of the opinions of each user group into perspective the reader should first refer to Page 5
"RESPONSE GROUPS and NUMBER OF RESPONSES"

TOP THREE PRIORITIES - by response group.....	Page 11
TOP TEN PRIORITIES - by response group.....	Page 12
RELATIVE NEED - by response group	Page 13
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% SUPPORT FOR ALL 41 TOPICS - all response groups	Page 20

RELATIVE NEED

Four topics were rated by more than 50% of all respondents as being in URGENT need of action: (PAGE 19)

- The development of a National Groundwater Strategy
- The allocation of \$ and human resources by water management agencies to groundwater resource management in the context of;
 - other resource management allocations
 - the economic value of groundwater
 - the contribution made by groundwater to surface water supplies
 - the current understanding of the consequences for future generations of present day groundwater management practices
- The protection of recharge areas;
 - well head protection
 - identification of potential sources of groundwater pollution
- Dumpsite location in relation to groundwater protection

Three topics (including two of the above) were SUPPORTED by more than 90% of all respondents; (PAGE 19)

- The National Groundwater Strategy
- The protection of recharge areas
- Agricultural practices in relation to groundwater use and protection.

PRIORITY TOPICS; TABLE 1(Top 3 - p. 11) TABLE 2(Top 10 - p. 12)

One of the topics rated as being in URGENT NEED of action by at least 50% of all respondents (in the "relative need" section of the questionnaire);

■ The National Groundwater Strategy

has been rated as being in the TOP THREE priorities by at least 50% of the following response groups;

- Other federal and provincial groundwater departments and agencies
- Municipal associations/officials
- Research community

35% of Consultants/private sector, and Federal and Provincial Resource Managers also rated the development of a National Groundwater strategy as one of their top three priorities.

■ The development of a National Groundwater Strategy was rated in the TOP TEN priorities of at least 50% of respondents in the following groups:

- Federal and provincial resource managers
- Other federal and provincial departments and agencies
- Municipal associations/agencies
- Research community
- Consultants

Another topic which was rated as being in URGENT need of action by at least 50% of all respondents (in the "relative need" section of the questionnaire);

■ the allocation of resources to groundwater management was rated in the TOP THREE priorities of at least 50% of respondents from the following groups:

- Federal and provincial resource managers
- Municipal associations/officials

35% of Researchers and 20% of Consultants also rated this topic as one of their top three priorities.

OTHER TOPICS WHICH WERE HIGHLY RATED by a significant number of respondents from several of the major user groups included;

- Aquifer mapping/groundwater availability studies
 - Aquifer designation/sensitivity mapping
 - Site remediation
 - Protection of recharge areas
 - Agricultural practices in relation to groundwater use and protection
 - Industrial and manufacturing practices in relation to groundwater use and protection
 - Municipal activities in relation to groundwater use and protection
 - Dumpsite location in relation to groundwater protection
 - Promotion of public awareness on groundwater matters
 - Promotion of increased awareness at the senior official and political levels
-

The overall priorities of all response groups, based on the "relative need" section of the questionnaire, indicate at least 75% support for the development of Groundwater Guidelines on 22 of the 41 topics. (PAGE 20)

Two topics, (PAGE 19)

- Aquifer pumping tests
- The selection and use of Global Positioning Systems

were rated as NOT NEEDED by more than 33% of all respondents *

*

Topics of a narrow technical nature (e.g. the selection and use of Global Positioning Systems, and earth energy development) and those of limited application (e.g. protection against saline intrusion) inevitably receive low ratings, (and a high % "no comment"). This does not mean that guidelines should not be developed for these topics on a priority basis.

INTRODUCTION

The National Survey to identify priority topics for the development of Groundwater Guidelines, was undertaken by Environment Canada in support of the activities of the Federal Provincial Groundwater Working Group (FPCWG).

The FPGWG is an ad hoc committee, presently composed, for the most part, of groundwater managers representing all provinces and several federal departments. (See APPENDIX 1)

The committee evolved from a series of national groundwater management workshops held over the past three years and is currently the principal mechanism by which the federal government consults with the provinces on groundwater matters. It is considered a temporary arrangement while awaiting the establishment of an accredited federal/provincial body to address groundwater management needs at the national level.

Process

Approximately 300 "key" officials and interested parties were sent the questionnaire and supporting material as per Appendices 2 & 3. The list of recipients was compiled from a number of sources including Environment Canada's Groundwater Directory, the Corpus Almanac and Canadian Sourcebook, and from information provided by the members of the Federal Provincial Groundwater Working Group. The original response deadline was February 15, 1993. This was subsequently extended to March 5, by which time approximately 112 responses had been received.

With a response of approximately 40% and a total named participation of 152 (Appendix 4), the survey can probably provide some meaningful information for the use of federal and provincial groundwater managers.

The time taken by all of you in completing the questionnaire, in consulting with your colleagues and in many instances, by providing extensive and useful comments, is most appreciated. To participants listed in Appendix 4 - THANK YOU.

Confidentiality

While the questionnaires give no indication that the information contained therein will be treated as confidential upon completion, it would seem appropriate that all input be used only for the purpose identified.

RESPONSE GROUPS; (and responses received by March 5, 1993)

- 1) FEDERAL AND PROVINCIAL GROUNDWATER RESOURCE MANAGERS
(26 Responses) including officials from Resource Management
Departments, Environment Departments, and Natural Resources
Departments.
- 2) OTHER FEDERAL AND PROVINCIAL DEPARTMENTS AND AGENCIES
(7 Responses)
- 3) MUNICIPAL ASSOCIATIONS/OFFICIALS (4 Responses)
- 4) RESEARCH COMMUNITY (21 Responses) including federal,
provincial, university and other research organizations.
- 5) CONSULTANTS/PRIVATE SECTOR (47 Responses). Many consultants
described their interest and expertise as being "research" or
"resource management" etc. All consultants have been put in
the Consultant/Private Sector group.
- 6) GROUPS REPRESENTING SCIENCE, INDUSTRY etc. (3 Responses)
- 7) ENVIRONMENTAL/CITIZEN's GROUPS (3 Responses)
- 8) LATE ENTRIES - included in statistical summaries
(5 Responses)
- not included in statistical summaries
(8 Responses)
- 9) NO SUPPORT EXPRESSED FOR ANY TOPIC (2 Responses)

GENERAL COMMENTS ON THE RESULTS

The diversity of views is demonstrated by the fact that every potential guideline topic was at least in one person's top ten list.

There is not necessarily a direct comparison between the results of the "top ten" listings and the "relative need" listings. Some people have recognized the importance of having topics addressed by management, but have either not commented on the "relative need" or have stated that a guideline is "not needed". This may be because they do not consider a "guideline" as being the appropriate means of addressing that particular topic, - or because they are aware of existing guidelines or criteria on that subject.

Therefore the top ten results should be considered as an indication of the perceived priority for management interest in that particular topic and not as an indication of the need to develop a guideline on that topic. Conversely a low level of support on the "relative need" chart may not necessarily mean that there is no need for management consideration for that particular topic.

Another factor which may influence the results is a probable lack of knowledge of some of the more specialized topics. This may result in a higher than normal number of "no comments". For this reason Table 3 provides a direct comparison between % SUPPORT and % NO COMMENT.

The 41 topics chosen for this survey were thought to represent many of the subjects which could perhaps be addressed by the development of "guidelines", or documented in some other manner. As discussions proceed the list will no doubt be amended through additions, deletions and regroupings.

The responses to this National Survey will, to some extent, reflect the views of those who generally support the idea of consolidating available knowledge and expertise (not necessarily by the use of guidelines) for the use of resource managers. The 60% of questionnaire recipients who did not respond may have greatly differing views. Hopefully their views will become known. The results therefore do not represent a consensus amongst the groundwater community as to the desirability of developing guidelines or of their priorities, but rather give some small indication of possible areas for priority consideration.

Analysis

With regard to multiple author questionnaires, such input presumably represents a consensus. While these represent a "survey within a survey" and should therefore be given more attention than

input from an individual, the weighting factor would be difficult to determine. In view of the intended uses for the information gathered, it was not thought necessary to incorporate such a refinement.

Analysis on a regional basis has not been done due to the small sample size within each of the seven occupation groups.

SUMMARY OF RESULTS

TOP THREE/TOP TEN PRIORITIES - By response group

NOTE:

WHEN CONSIDERING THE RESULTS IN TABLES 1 AND 2 PLEASE NOTE THAT SOME RESPONSE GROUPS HAVE VERY FEW PARTICIPANTS.

TABLE 1 TOP THREE PRIORITIES

[illegible]

RELATIVE NEED - by response group

NOTE:

WHEN CONSIDERING THE FOLLOWING RESULTS PLEASE NOTE THAT SOME RESPONSE GROUPS HAVE VERY FEW PARTICIPANTS.

Topics rated as URGENT by more than 50% of respondents

FEDERAL AND PROVINCIAL GROUNDWATER RESOURCE MANAGERS 26 RESPONSES
(combined "national priorities" and "agency priorities")

- Allocation of resources
- Aquifer mapping
- Aquifer designation
- Protection of recharge areas
- Agricultural practices
- Dumpsite location
- Public awareness
- Awareness at senior official and political level

THE FEDERAL AND PROVINCIAL DEPARTMENTS AND AGENCIES 7 responses
(combined "national" and "agency" priorities)

- National groundwater strategy
- Site assessment
- Site remediation
- Agricultural practices
- Municipal activities
- Dumpsite location
- Promoting awareness at senior official and political levels

MUNICIPAL ASSOCIATIONS/OFFICIALS 4 responses
(Rated as urgent by at least 3 of the 4 respondents)

- National groundwater strategy
- Allocation of resources
- Aquifer mapping
- "Probability of contamination" mapping
- Establishing observation well networks
- Awareness at senior official and political levels

RESEARCH COMMUNITY 21 responses

- National Groundwater Strategy
- Allocation of resources
- Aquifer mapping
- "Probability of contamination" mapping

- Protection of recharge areas
- Agricultural practices
- Municipal activities
- Dumpsite location
- Public awareness

CONSULTANTS/PRIVATE SECTOR

47 responses

- Protection of recharge areas

GROUPS REPRESENTING SCIENCE, INDUSTRY etc.,

3 responses

(rated as urgent by at least 2 of the 3 respondents)

None

ENVIRONMENTAL/CITIZEN'S GROUPS

3 responses

(Rated as urgent by at least 2 of the 3 respondents)

- Protection of recharge areas
- Mining, minerals and metallurgical processes
- Oil and gas industry activities

LATE ENTRIES (2 management, 1 research, 1 mining, 1 consultant)

- Protection of recharge areas
- Municipal activities
- Awareness at senior official and political levels

Topics rated as URGENT, or NEEDED (not urgent) by more than 90%
of respondents

FEDERAL AND PROVINCIAL GROUNDWATER RESOURCE MANAGERS

(combined "national" and "agency" priorities)

- National Groundwater Strategy
- Aquifer mapping
- Aquifer designation
- Protection of recharge areas
- Dumpsite location

OTHER FEDERAL AND PROVINCIAL DEPARTMENTS AND AGENCIES

(Combined national and agency priorities)

- National groundwater strategy
- Site assessment
- Site remediation
- Agricultural practices
- Oil and gas industry activities
- Promoting public awareness
- National groundwater information source

MUNICIPAL ASSOCIATIONS/OFFICIALS

(Rated as urgent or needed by at least 3 of the 4 respondents)

- 28 topics - All except 8, 11, 15, 17, 22, 23, 25, 26, 31 to 34, and 37.

RESEARCH COMMUNITY

- Allocation of resources
- Aquifer mapping
- "Probability of contamination" mapping
- Protection of recharge areas
- Agricultural practices
- Dumpsite location

CONSULTANTS/PRIVATE SECTOR

- National Groundwater Strategy
- Protection of recharge areas
- Agricultural practices
- Industrial and manufacturing practices

GROUPS REPRESENTING SCIENCE, INDUSTRY etc.,

(Rated as urgent or needed by at least 2 of the 3 respondents)

- National groundwater strategy
- Site remediation
- Saline intrusions
- Protection of recharge areas
- Agricultural practices
- "State of groundwater" reporting
- Lab. procedures/analytical processes
- Provincial requirements re well drilling industry
- National information source

ENVIRONMENTAL/CITIZEN'S GROUPS

(Rated as urgent or needed by at least 2 of the 3 respondents)

- National groundwater strategy
- Aquifer mapping
- Aquifer designation
- Site remediation
- Protection of recharge areas
- Agricultural practices
- Forestry activities
- Industrial and manufacturing practices
- Mining, minerals and metallurgical processes
- Oil and gas industry activities
- Municipal activities
- Public awareness
- Awareness at senior official and political levels

- "State of groundwater" reporting
- Groundwater flow models
- Contaminant flow models

LATE ENTRIES (2 management, 1 research, 1 mining, 1 consultant)
(Rated as urgent or needed by at least 4 of the 5 respondents)

- 31 topics - all except 6, 8, 9, 22, 23, 29, 33, 39, 40, 41.

Topics rated as NOT NEEDED by more than 33% of respondents

FEDERAL AND PROVINCIAL GROUNDWATER RESOURCE MANAGERS
(combined national and agency priorities)

- Pumping tests

OTHER FEDERAL AND PROVINCIAL DEPARTMENTS AND AGENCIES
(Combined national and agency priorities)

None

MUNICIPAL ASSOCIATIONS/OFFICIALS
(Rated as not needed by at least 2 of the 4 respondents)

- Earth energy
- Background contaminant data
- Pumping tests
- Field practices
- Selection of GPS equipment
- Lab. procedures/analytical processes

RESEARCH COMMUNITY

- Determination of groundwater value
- Pumping tests
- GPS equipment

CONSULTANTS/PRIVATE SECTOR

- Determination of groundwater value
- Use of economic instruments
- Earth energy
- Pumping tests
- GPS equipment

GROUPS REPRESENTING SCIENCE, INDUSTRY etc.,

(rated as not needed by at least 2 of the 3 respondents)

- Well construction

ENVIRONMENTAL/CITIZEN'S GROUPS

(Rated as not needed by at least 2 of the 3 respondents)

- Data management
- Client services

LATE ENTRIES (2 management, 1 research, 1 mining, 1 consultant)

(Rated as not needed by at least 2 of the 5 respondents)

- Establish observation well networks
- Earth energy
- International liaison
- National information source
- Public information bulletins

Topics rated as DO NOT DEVELOP, POTENTIAL NEGATIVE IMPACT by
more than 20% of respondents

FEDERAL AND PROVINCIAL GROUNDWATER RESOURCE MANAGERS

(combined national and agency responses)

None

OTHER FEDERAL AND PROVINCIAL DEPARTMENTS AND AGENCIES

(Combined national and agency priorities)

None

MUNICIPAL ASSOCIATIONS/OFFICIALS

(Rated as potentially harmful by at least 2 of the 4 respondents)

None

RESEARCH COMMUNITY

- Groundwater flow models
- Contaminant flow models

CONSULTANTS/PRIVATE SECTOR

None

GROUPS REPRESENTING SCIENCE, INDUSTRY etc.,

(Rated as potentially harmful by at least 2 of the 3 respondents)

None

ENVIRONMENTAL/CITIZEN'S GROUPS

(Rated as potentially harmful by at least 2 of the 3 respondents)

None

LATE ENTRIES (2 management, 1 research, 1 mining, 1 consultant)

(Rated as potentially harmful by at least 2 of the 5 respondents)

None

RELATIVE NEED - All response groups

Topics rated as URGENT by more than 50% of respondents

- National groundwater strategy
- Allocation of resources
- Protection of recharge areas
- Dumpsite location

Topics rated as URGENT, or NEEDED (not urgent) by more than 90% of respondents

- National groundwater strategy
- Protection of recharge areas
- Agricultural practices re groundwater use and protection

Topics rated as NOT NEEDED by more than 33% of respondents

- Aquifer pumping tests
- Selection of GPS equipment

Topics rated as DO NOT DEVELOP, POTENTIAL NEGATIVE IMPACT by more than 20% of respondents

None

TABLE 3

<p>OVERALL PRIORITY BASED ON "RELATIVE NEED"</p> <p>All response groups</p>

Note:

There is, to some extent, a relationship between the "% Support" and the "% No comment" columns. This is particularly apparent in instances where topics have received relatively little support. It should be kept in mind when considering the need for the development of guidelines on some of the more technical and consequently less well known topics.

	<u>Topic #</u>	<u>% Support</u>	<u>% No comment</u>
1) PROTECTION OF RECHARGE AREAS	13	95	4
2) NATIONAL GROUNDWATER STRATEGY	1	95	1
3) AGRICULTURAL PRACTICES RE	14	95	4
RE GROUNDWATER USE AND PROTECTION			
4) DUMPSITE LOCATION RE	20	89	4
GROUNDWATER PROTECTION			
5) INDUSTRIAL AND MANUFACTURING	16	89	4
PRACTICES RE GROUNDWATER USE			
AND PROTECTION			
6) ALLOCATION OF RESOURCES BY	2	88	4
WATER MANAGEMENT AGENCIES			
7) AQUIFER MAPPING	3	88	4
8) MUNICIPAL ACTIVITIES RE	19	86	6
GROUNDWATER USE AND PROTECTION			
9) AQUIFER DESIGNATION/	4	86	5
SENSITIVITY MAPPING			
10) MINING, MINERALS AND	17	86	6
METALLURGICAL PROCESSES RE			
GROUNDWATER USE AND PROTECTION			
11) PROMOTING PUBLIC AWARENESS	27	85	2
12) OIL AND GAS INDUSTRY ACTIVITIES	18	85	9
RE GROUNDWATER USE AND PROTECTION			
13) SITE REMEDIATION	10	84	6
14) AWARENESS AT SENIOR OFFICIAL	28	81	3
AND POLITICAL LEVELS			
15) SITE ASSESSMENT	9	81	4
16) SEPTIC SYSTEMS RE GROUNDWATER	21	81	5
PROTECTION			
17) WELL AND TEST HOLE ABANDONMENT	11	81	8
18) NATIONAL GROUNDWATER	40	81	4
INFORMATION SOURCE			
19) BACKGROUND CONTAMINANT DATA	25	79	9
20) PUBLIC INFORMATION BULLETINS	41	78	4

	<u>Topic #</u>	<u>% Support</u>	<u>% No comment</u>
21) FORESTRY ACTIVITIES RE RE GROUNDWATER SUPPLY AND PROTECTION	15	77	9
22) "PROBABILITY OF CONTAMINATION" MAPPING	5	75	4
23) GROUNDWATER DATA MANAGEMENT	24	74	11
24) "STATE OF GROUNDWATER" ASSESSMENT AND REPORTING	29	74	7
25) DEEP WELL WASTE DISPOSAL	23	73	11
26) STANDARDIZATION OF LABORATORY PROCEDURES	37	72	9
27) OBSERVATION WELL NETWORKS	6	71	7
28) PROVINCIAL REQUIREMENTS RE WELL DRILLING INDUSTRY	38	70	13
29) PROVISION OF CLIENT SERVICES	38	68	11
30) INTERNATIONAL LIAISON	39	68	7
31) ASSESSMENT AND USE OF GISS	36	65	7
32) PROTECTION AGAINST SALINE INTRUSION	12	65	11
33) ASSESSMENT AND USE OF CONTAMINANT FLOW MODELS	35	65	7
34) WELL CONSTRUCTION	30	64	6
35) ASSESSMENT AND USE OF GROUNDWATER FLOW MODELS	34	63	6
36) DETERMINATION OF GROUNDWATER VALUE	7	62	7
37) FIELD PRACTICES	32	59	8
38) AQUIFER PUMPING TESTS	31	54	9
39) EARTH ENERGY DEVELOPMENT (HEAT PUMPS)	22	53	18
40) USE OF ECONOMIC INSTRUMENTS	8	50	7
41) SELECTION OF GPS EQUIPMENT FOR USE IN GROUNDWATER ACTIVITIES	33	42	22

TABLE 4

DETAILED RESULTS FOR "RELATIVE NEED" All response groups

(Combined "national" and "agency" priorities)

	URGENT	NEEDED	NOT NEEDED	HARMFUL?	NO COMMENT
	95 %				
National groundwater strategy	56	39	3	2	1
GENERAL					
	88 %				
Allocation of \$ and human resources by water management agencies to groundwater resource management	51	37	8	0	4
	88 %				
Aquifer mapping/groundwater availability studies/identification of aquifer recharge areas	38	50	6	2	4
	86 %				
Aquifer designation/sensitivity mapping	37	49	7	2	5
	75 %				
"Probability of contamination" mapping	38	37	18	4	4
	35 %				
Establishing observation well networks	20	15	20	1	7
	62 %				
The determination of groundwater value/the assessment of competing uses and allocation of supplies	20	42	25	5	7
	50 %				
The use of economic instruments to achieve groundwater management goals	11	39	27	5	17
	81 %				
Site assessment	38	43	13	2	4
	84 %				
Site remediation	40	44	8	2	6
	81 %				
Well and test hole abandonment	28	53	11	0	8

	URGENT	NEEDED	NOT NEEDED	HARMFUL?	NO COMMENT
	<u>65 %</u>				
Protection against saline intrusion into aquifers	9	56	24	0	11

THE ACTIVITIES OF LAND BASED SECTORS IN RELATION TO GROUNDWATER PROTECTION

	<u>95 %</u>				
Protection of recharge areas	60	35	2	0	4
	<u>95 %</u>				
Agricultural practices in relation to groundwater use and protection	46	49	2	0	4
	<u>77 %</u>				
Forestry activities in relation to groundwater supply and protection	26	51	11	3	9
	<u>89 %</u>				
Industrial and manufacturing practices in relation to groundwater use and protection	42	47	6	1	4
	<u>86 %</u>				
Mining, minerals and metallurgical processes in relation to groundwater use and protection	36	50	6	1	6
	<u>85 %</u>				
Oil and gas industry activities in relation to groundwater use and protection	37	48	5	1	9
	<u>86 %</u>				
Municipal activities in relation to groundwater use and protection	41	45	8	0	6
	<u>89 %</u>				
Dumpsite location in relation to groundwater protection	51	38	7	0	4
	<u>81 %</u>				
Septic systems in relation to groundwater protection	35	46	12	1	5
	<u>53 %</u>				
Earth energy developments	17	36	27	2	18
	<u>73 %</u>				
Deep well waste disposal in relation to groundwater protection	35	38	9	8	11

DATA AND INFORMATION

	<u>74 %</u>				
Groundwater data management	35	39	13	2	11
	<u>79 %</u>				
Accumulation of background contaminant data	22	57	11	2	9

	URGENT	NEEDED	NOT NEEDED	HARMFUL?	NO COMMENT
	<u>68 %</u>				
Provision of client services for groundwater data and information	16	52	14	6	11
	<u>85 %</u>				
Promoting public awareness of groundwater matters	43	42	10	4	2
	<u>81 %</u>				
Promoting increased awareness at the senior official and political level	48	33	13	4	3
	<u>74 %</u>				
"State of groundwater" assessment and reporting	25	49	18	2	7
TECHNICAL					
	<u>64 %</u>				
Well construction/well operation and maintenance	22	42	26	4	6
	<u>54 %</u>				
Aquifer pumping tests	13	41	34	4	9
	<u>59 %</u>				
Field practices in groundwater exploration and sampling	12	47	28	4	8
	<u>42 %</u>				
The selection of GPS equipment for use in groundwater activities	3	39	34	3	22
	<u>63 %</u>				
The assessment and use of groundwater flow models	4	59	22	8	6
	<u>65 %</u>				
The assessment and use of contaminant flow models	7	58	19	8	7
	<u>65 %</u>				
The assessment and use of Geographical Information Systems for use in groundwater activities	13	52	19	9	7
	<u>72 %</u>				
Standardization of lab procedures/analytical processes	31	41	15	4	9
ADMINISTRATIVE					
	<u>70 %</u>				
Provincial requirements in relation to the well drilling industry	25	45	15	2	13

	URGENT	NEEDED	NOT NEEDED	HARMFUL?	NO COMMENT
TECHNOLOGY TRANSFER					
	<u>68 %</u>				
International liaison for the purposes of the transfer of technology	16	52	22	3	7
OTHER INFORMATION ACTIVITIES					
	<u>81 %</u>				
National groundwater information source (not raw data)	16	65	14	1	4
	<u>78 %</u>				
Public information bulletins	17	61	18	1	4

TABLE 5

AVERAGE SUPPORT FOR GUIDELINES

<u>GROUP</u>	<u>URGENT</u>	<u>NEEDED</u>	<u>NOT NEEDED</u>	<u>POTENTIALLY HARMFUL</u>	<u>NO COMMENT</u>
FED/PROV RESOURCE MANAGERS	32%	45%	13%	1%	9%
OTHER FED/PROV. OFFICIALS	insufficient input				
MUNICIPAL ASSOC./OFFICIALS	insufficient input				
RESEARCH COMMUNITY	31%	46%	14%	4%	5%
CONSULTANTS/PRIVATE	27%	47%	17%	4%	5%
REP. GROUPS SCIENCE, INDUSTRY ETC.	insufficient input				
ENV/CITIZENS GROUPS	insufficient input				

MEMBERS OF THE FEDERAL/PROVINCIAL GROUNDWATER WORKING GROUP

Provinces:

Newfoundland: Env. and Lands	K. Guzzwell (709)	729	5733
Prince Edward Island: Environment	G. Somers (902)	368	5046
Nova Scotia: Environment	H. Doane (902)	424	5300
New Brunswick: Environment	D. Pupeck (506)	457	4848
Quebec: Environment	R. McCormack (418)	644	3561
Ontario: Environment	S. Singer (416)	314	4166
Manitoba: Natural Resources	L. Gray (204)	945	7403
Saskatchewan: Water Corporation	N. Shaheen (306)	694	3963
Alberta: Environment	R. Hardick (403)	427	6231
British Columbia: Env, Lands & Parks	R. Zimmerman (604)	387	9464
Prairie Provinces Water Board	R. Kellow (306)	522	5571

Municipalities:

Regional Municipality of Waterloo	J. Robinson (519)	885	9424
Cumberland District Planning Commission, Nova Scotia	J. Sponagle (902)	667	5141

Federal:

Environment Canada	J. Gilliland (Chairman)	(819)	953	1521
	E. Nicolson (Secretary)	(819)	994	6621
	J. Gibb - Atlantic reg.	(902)	426	1698
	D. McNaughton-W & N reg.	(403)	468	8029
	H. Leibscher -P & Y reg.	(604)	666	0807
	K. Novakowski - NWRI	(416)	336	4610
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Agriculture	J. Lebedin (PFRA)	(306)	780	5207
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- Surveys and Information Systems Branch	H. Lerer
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Manitoba Association of Urban

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SURVEY TO IDENTIFY PRIORITY TOPICS FOR GROUNDWATER GUIDELINES

DEFINITION; Websters New World Dictionary

Guideline A standard or principle by which to make a judgement or determine a policy or course of action.

PLEASE CONSULT THE ATTACHED LIST OF RECIPIENTS AND DECIDE IF YOU WILL COORDINATE YOUR RESPONSE WITH OTHERS IN YOUR ORGANIZATION.

Please send the completed questionnaire BY DECEMBER 1, in the enclosed envelope to;

E. M. Nicolson
Groundwater Management
Economics and Conservation Branch
Ecosystem Sciences and Evaluation Directorate
Conservation and Protection Service
Environment Canada
Ottawa K1A 0H3

Tel: (819) 997 2324

Fax: (819) 997 8701

THIS RESPONSE REPRESENTS THE VIEWS OF;

NAME: (individual or organization) _____

ADDRESS: _____

TELEPHONE: (____) _____ FAX: (____) _____

If this is a coordinated response, please indicate those individuals contributing to this response.

The stated priorities represent the respondent's view of
() national () agency priorities.

PRIMARY ACTIVITY OF ABOVE RESPONDENT;

Resource management _____ ()

Research _____ ()

Advocacy (e.g.interest group etc.) _____ ()

Professional Association _____ ()

Specific interest USER (e.g. industrial and manufacturing,
government sector, etc.) _____ ()

Other _____

Potential Topics (Not in order of priority)

- ## GENERAL

2. Allocation of **£** and human resources by water management agencies to groundwater resource management in the context of:

- other resource management allocations
- the economic value of groundwater
- the contribution made by groundwater to surface water supplies
- the current understanding of the consequences for future generations of present day groundwater management practices

3. Aquifer mapping / groundwater availability studies / identification of aquifer recharge areas _____
4. Aquifer designation / sensitivity mapping _____
5. "Probability of contamination" mapping _____
6. Establishing observation well networks _____
7. The determination of groundwater value / the assessment of competing uses and allocation of supplies _____
8. The use of economic instruments to achieve groundwater management goals _____
9. Site assessment _____
 - criteria for selection of sites for assessment and cleanup / monitoring procedures, etc. _____
10. Site remediation _____
 - cleanup methods, objectives, etc. _____
11. Well and test hole abandonment _____
 - criteria for requiring site cleanup _____
 - cleanup/containment procedures, materials and equipment _____
12. Protection against saline intrusion into aquifers _____

[illegible]

Potential Topics (Not in order of priority)

THE ACTIVITIES OF LAND BASED SECTORS IN RELATION TO GROUNDWATER PROTECTION

Guidelines for:

- 13 The protection of recharge areas
- well-head protection
 - identification of potential sources of groundwater pollution
- 14 Agricultural practices in relation to groundwater use and protection
- intensive livestock practices
 - pesticide and fertilizer use
 - well-lime in relation to barnyard waste
 - irrigation by groundwater

15. Forestry activities in relation to groundwater supply and protection
- harvesting
 - pesticides

- 16 Industrial and manufacturing practices in relation to groundwater use and protection
- 17 Mining, minerals and metallurgical processes in relation to groundwater use and protection

18. Oil and gas industry activities in relation to groundwater use and protection

- ## 19 Municipal activities in relation to groundwater use and protection

- 20 Dumpsite location in relation to groundwater protection

- ## 2.1 Septic systems in relation to groundwater protection

- ## 2.2 Earth energy developments

- technology / construction practices / closed-loop nature, etc.
- promotional material prepared by the Energy Sector

- limitations/restrictions

- 23** Deep well waste disposal in relation to groundwater protection

DATA AND INFORMATION

Guidelines for:

- 24 Groundwater data management
- electronic data capture at wellhead and direct data entry to provincial data bases
 - data exchange between existing data bases through the use of standardized terminology
 - data comparability through agreement on aspects of accuracy and precision

[illegible]

"GUIDELINES" FOR GROUNDWATER MANAGEMENT AND DEVELOPMENT
Potential Topics (Not in order of priority)

A. RELATIVE NEED

- 1 = urgent
2 = needed, not urgent
3 = not needed
4 = do not develop guidelines - potential negative impact on groundwater management
5 = not rated

1 2 3 4 5 use an "x"

B. LIST YOUR TOP 10 TOPICS (FROM THE 41 SUGGESTED), IN ORDER OF PRIORITY
1 = most important

COMMENTS

1	2	3	4	5
1	2	3	4	5

1	2	3	4	5
1	2	3	4	5
1	2	3	4	5

1	2	3	4	5
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--	--	--	--	--

1	2	3	4	5
1	2	3	4	5

--	--	--	--	--

1	2	3	4	5
1	2	3	4	5

--	--	--	--	--

1	2	3	4	5
1	2	3	4	5

--	--	--	--	--

1	2	3	4	5
1	2	3	4	5

--	--	--	--	--

1	2	3	4	5
1	2	3	4	5

--	--	--	--	--

1	2	3	4	5
1	2	3	4	5

--	--	--	--	--

1	2	3	4	5
---	---	---	---	---

--	--	--	--	--

- 25 Accumulation of background contaminant data _____
- 26 The provision of client services for groundwater data and information _____
- charging for data / cost recovery (raw data / interpretive services)
- implications of "access to information" legislation
- provision of provincially approved private sector data monopolies
- provision of on-line information
- interaction with well drilling industry
- 27 Promoting public awareness of groundwater matters _____
- 28 Promoting increased awareness at the senior official and political levels _____
- 29 "State of groundwater" assessment and reporting _____

TECHNICAL

Guidelines for:

- 30 Well construction / well operation and maintenance _____
- water supply wells / monitoring wells
- 31 Aquifer pumping tests _____
- 32 Field practices in groundwater exploration and sampling _____
- 33 The selection of GPS equipment for use in groundwater activities _____
- 34 The assessment and use of groundwater flow models _____
- 35 The assessment and use of contaminant flow models _____
- 36 The assessment and use of Geographical Information Systems for use in groundwater activities _____
- 37 Standardization of lab procedures / analytical processes _____

ADMINISTRATIVE

Guidelines for:

- 38 Provincial requirements in relation to the well drilling industry _____
- the education and licensing of well drillers
- the role of drillers vis-a-vis the provincial need for the collection of data that may not be of direct use to the well driller - eg. certain water quality parameters

"GUIDELINES" FOR GROUNDWATER MANAGEMENT AND DEVELOPMENT
Potential Topics (Not in order of priority)

A. RELATIVE NEED

- 1 = urgent
2 = needed, not urgent
3 = not needed
4 = do not develop guidelines - potential negative impact on groundwater management
5 = not rated

1 2 3 4 5

Use an "x"

B. LIST YOUR TOP 10 TOPICS (FROM THE 41 SUGGESTED), IN ORDER OF PRIORITY
1 = most important

COMMENTS

TECHNOLOGY TRANSFER

- 39 International liaison for the purposes of: _____
 - the transfer of Canadian technology and expertise to other countries
 - encouraging Canadian industry and science to keep abreast with the latest developments in other countries
 (See also "National Groundwater Information Source")

1 2 3 4 5

OTHER INFORMATION ACTIVITIES

- 40 National groundwater information source (not raw data) _____
 - publications, software availability, conferences, expertise, courses, technical information
 - central repository of groundwater information
 - means of achieving international input/output

1 2 3 4 5

- 41 Public information bulletins _____
 "How to" bulletins
 - test well water
 - get information on groundwater
 - have a well installed
 - have a heat pump installed
 - obtain groundwater supply for the home
 - etc.

1 2 3 4 5

PARTICIPANTS

APPENDIX 4

SEPARATE QUESTIONNAIRES RECEIVED

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Prince Edward Island
PEI Environment
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ROBINSON A.M.

New Brunswick

New Brunswick Environment
New Brunswick Environment
New Brunswick/Geological Surveys Branch
New Brunswick Natural Resources
New Brunswick Natural Resources
New Brunswick Natural Resources

CRAIG D.
PUPEK D.A.
RUITENBERG A.A.
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no name
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Golder Associés Ltée., Pointe-Claire, Québec
LaSalle Consulting Group Inc.,
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Lupien - Rosenberg and Associates Inc.,
Lachine, Québec
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Roche Ltée, Laval, Québec
St-Laurent, Québec
Ste-Foy, Québec
Ste-Foy, Québec
Québec, Québec

BILODEAU D.
BÉLANGER A.J.

TREMBLAY J.J.
MORIN R./AMOURS L.D.
VERGE M.J./DROLET M.

PARKINSON F.E.
AUBIN Y.
GRENIER C./CARON M.R.
HANSBURY P.
ROSENBERG P.

CHABOT D.
ST-GERMAIN R.
MARINEAU L.
PINEAULT J.
DES ROSIERS R.
TARDIF Y.

Ontario

Arcturus Environmental, Niagara Falls, Ont.
Gartner Lee Limited, Markham, Ontario
HBT AGRA Ltd., Mississauga, Ontario
Hydroterra Limited, Thornhill, Ontario
Intera, Nepean, Ont.
International Water Consultants, Barrie, Ont.
Merrickville, Ontario
Nepean, Ontario
Nepean, Ontario
Waterloo Geoscience Consultants,
Waterloo, Ont.
Waterloo Hydrogeologic Software,
Waterloo, Ont.

OSBORNE M.
LEECH R.
OSTRY R.C.
BRYCK L.
LAFLEUR D.
KUEHL, G.A.
TRUSTY W.
RITCEY G.M.
SABOURIN L.

no name

GUIGUER, N.

Manitoba

Dyregrov Consultants, Winnipeg, Manitoba
HBT AGRA Limited, Winnipeg, Manitoba
KGS Group, Winnipeg, Manitoba
Wardrop Engineering Inc., Winnipeg, Manitoba

no name
no name
SMITH J.R.
THOMPSON B./
WOLOWICH E./
HORNING B./
WIEBE M./PARRY J./
ALLARD R.

Saskatchewan

Beckie Hydrogeologists, Regina, Saskatchewan FAMULAK M.

Alberta

Calgary, Alberta CAMPBELL K.
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ROBERTSON C./HILLER J.
Terracon Geotechnique Ltd., Calgary, Alberta NICHOLS L.

British Columbia

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EBA Engineering Ltd., Vancouver, B.C. SYLTE S.
Kea Pacific Holdings Inc.,
North Vancouver, B.C. SMITH A.
Klohn Leonoff, Richmond, B.C. SMITH R./QUINN O.
Payne Engineering Geology, Sidney, B.C. no name
R.A.Freeze Engineering Inc., Whiterock, B.C. FREEZE R.A.
Vernon, B.C. WILSON H.G.
Victoria, British Columbia TURNER W.R.

GROUPS REPRESENTING SCIENCE INDUSTRY ETC.

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Contractors, Calgary, Alberta no name
Canadian Association of Petroleum Producers
Calgary, Alberta WEBSTER G.
Canadian Water Resources Association
Winnipeg, Manitoba MacKAY G.H.
Canadian Water Well Association,
Springfield, Ontario WILSON J.R.

ENVIRONMENTAL/CITIZEN'S GROUPS

Conservation Council of New Brunswick,
Fredericton no name
Canadian Nature Federation GELFAND J.
Cities of New Brunswick Association no name
(Bathurst, Campbellton, Fredericton, Moncton, St. John)



Compiled with the cooperation of 152 scientists, government officials,
consultants and educators.